

WHAT IS CLAIMED IS:

1. A solid fuel for generating a gaseous fuel for use in a fuel cell, comprising:  
an oxygenate compound selected from the group consisting of metal oxygenates, gelled oxygenates, frozen oxygenates, and mixtures thereof.
- 5 2. The solid fuel of claim 1 wherein the gelled oxygenates comprise a mixture of an oxygenate and a polymer.
3. The solid fuel of claim 2 wherein the gelled oxygenate comprises:  
an oxygenate selected from the group consisting of alcohols, aldehydes, organic acids, ethers, diols, triols, ketones, diketones, esters, carbonates, oxalates, sugars, and  
10 mixtures thereof; and  
a polymeric mixture selected from the group consisting of acrylic acid based polymers, acrylic amide based polymers, copolymers of polyols, copolymers of oligomers containing OH groups with formaldehyde, ethylene/acrylic acid copolymers with amine emulsifiers, carbonyl vinyl polymers, polyacrylic acid polymers, olefin-  
15 maleic anhydride copolymers, and mixtures thereof.
4. The solid fuel of claim 3 wherein the gelled oxygenate comprises:  
methanol in an amount of at least 30 weight percent; and  
an acrylic polymer in an amount of at least 3 weight percent.
5. The solid fuel of claim 3 wherein the gelled oxygenate comprises:  
20 acetaldehyde in an amount of at least 30 weight percent; and  
an acrylic polymer in an amount of at least 3 weight percent.
6. The solid fuel of claim 2 wherein the gelled oxygenate further comprises a metal or metal compound, where the metal is selected from the group consisting of alkali metals, alkaline earth metals, and mixtures thereof.
- 25 7. The solid fuel of claim 6 wherein the metal or metal compound is selected from the group consisting of magnesium hydroxide ( $\text{Mg}(\text{OH})_2$ ), magnesium oxide ( $\text{MgO}$ ), magnesium methoxide ( $\text{Mg}(\text{OCH}_3)_2$ ), magnesium ( $\text{Mg}$ ), magnesium hydride ( $\text{MgH}_2$ ), and mixtures thereof.

8. The solid fuel of claim 1 wherein the frozen oxygenate comprises a mixture of an oxygenate and a material selected from the group consisting of high melting point alcohols, high melting point glycols, high melting point hydrocarbons, sugar esters, metal alkoxides, and mixtures thereof.
- 5 9. The solid fuel of claim 1 wherein the metal oxygenate comprises a metal selected from the group consisting of lithium (Li), sodium (Na), potassium (K), beryllium (Be), magnesium (Mg), calcium (Ca), rubidium (Rb), cesium (Cs), strontium (Sr), barium (Ba), aluminum (Al), and mixtures thereof.
- 10 10. The solid fuel of claim 9 wherein the metal is selected from the group consisting of lithium, sodium, potassium, magnesium, and mixtures thereof.
11. The solid fuel of claim 2 further comprising an additive wherein the additive is chosen to substantially absorb all the carbon dioxide produced.
12. The solid fuel of claim 11 wherein the additive is a compound selected from the group consisting of alkali metal oxide, alkali metal hydroxide, alkaline earth metal oxide, alkaline earth metal hydroxide, and mixtures thereof.
- 15 13. The solid fuel of claim 1 wherein the fuel further comprises a solid oxidant.
14. The solid fuel of claim 13 wherein the solid oxidant is selected from the group consisting of sodium percarbonate, carbamide hydrogen peroxide, organic peroxides, and mixtures thereof.
- 20 15. The solid fuel of claim 14 further comprising a solid catalyst selected from the group consisting of transition metals, oxides of transition metals, and mixtures thereof.
16. The solid fuel of claim 15 wherein the catalyst is selected from the group consisting of oxides of Mn, oxides of Fe, and mixtures thereof.
17. The solid fuel of claim 1 wherein the oxygenate comprises a metal alkoxide or a metal aldehyde having from 1 to 12 carbons.
- 25 18. The solid fuel of claim 17 wherein the alkoxide is a methoxide or an ethoxide.
19. The solid fuel of claim 1 further comprising a metal hydride selected from the group consisting of lithium hydride, magnesium hydride, sodium hydride, potassium hydride, aluminum hydride, and mixtures thereof.